TAD03 – A4 IB Practice MS

1. (a) *P*: $C_2H_5{}^{35}Cl^+$ and $C_2H_5{}^{37}Cl^+$;

Q: $C_2H_4{}^{79}Br_2{}^+$, $C_2H_4{}^{81}Br_2{}^+$, $C_2H_4{}^{79}Br^{81}Br^+$; 3

*Award **[2]** for all three, **[1]** for two.*
*(+ sign **not** needed for marks)*
*If only C_2H_5Cl and $C_2H_4Br_2$ given, with no mass numbers, award **[1]**.*

(b) *C_2H_4Br*: 108 **and** 110;

$CHCl_2$: 98 **and** 100 **and** 102; 2

[5]

2. (a) (i) aldehydes, ketones, (carboxylic) acids and esters; 1

All four needed for mark, ignore any formulas.
Do not award mark if any others included.

(ii) (carboxylic) acids and esters; 1

(b) (i) (15) $CH_3{}^+$;

(29) $CH_3CH_2{}^+$ / $C_2H_5{}^+$ / CHO^+; 2

Do not accept COH^+.
Penalize missing charge once only.

(ii) CH_3CH_2CHO; 1

[5]

3. (a) $C_3H_8O^+$; 1

Accept more detailed formula such as $CH_3CH_2CH_2OH^+$.

(b) CH_3O^+ / CH_2OH^+; 1

For (a) and (b), if charge is missing penalize once only.

(c) (A) $CH_3CH_2CH_2OH$;

Accept more detailed formula.

(B) $CH_3CH(OH)CH_3$; 2

Accept more detailed formula.
Hydrogen(s) missing, penalize once only.
*Award **[1]** if both structures correct but the wrong way round.*

[4]

4. (a) (i) 92 due to ^{35}Cl and 94 to ^{37}Cl/there are two isotopes of chlorine;
present in ratio 3:1/abundances are 75% and 25%; 2

(ii) (m/z = 77) $C_3H_6Cl^+$/$(CH_3)_2CCl^+$;

(m/z = 57) $C_4H_9{}^+$/$(CH_3)_3C^+$; 2

Penalize missing charges once only

(b) 84
86
88 2

*Award **[2]** for all three correct, **[1]** for any two correct.*

[6]